



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/829,549 | 04/22/2004 | Junru Jiao | PGS-03-07US | 7309 |
| 7590 07/26/2005 | | | EXAMINER | |
| E. Eugene Thigpen Petroleum Geo-Services, Inc. P.O. Box 42805 Houston, TX 77242-2805 | | | HUGHES, SCOTT A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3663 | |

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/829,549

Applicant(s)

JIAO ET AL.

Examiner

Scott A. Hughes

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/22/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>6/24/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-6, drawn to a method for processing seismic data, classified in class 367, subclass 51.
- II. Claims 7-12, drawn to a computer program, classified in class 367, subclass 38.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by hand or by manual selection by a user.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with E. Eugene Thigpen on 7/15/2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-6. Affirmation of this election must be made by applicant in replying to this Office action. Claims 7-12 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6 are rejected under 35 U.S.C. 102(a) as being anticipated by Ahmed (Journal of Seismic Exploration 12, 237-257 (2003)).

With regard to claim 1, Ahmed discloses a method for processing seismic data. Ahmed discloses prestack depth migrating the seismic data to generate common image gathers using an initial velocity-depth model, selecting at least one horizon in the migrated seismic data, performing a residual migration velocity analysis in the depth-offset domain at the at least one selected horizon, and updating the velocity-depth model based on the residual migration velocity analysis (Fig. 5) (Pages 238-241, 244, 256).

With regard to claim 2, Ahmed discloses that the prestack depth migration comprises Kirchhoff integral depth migration (Page 241, First paragraph; Page 247).

With regard to claim 3, Ahmed discloses that the residual migration velocity analysis comprises applying a perturbation to an initial value of slowness used in the migration, applying a residual moveout in a common image gather, determining flatness in a common image gather at a selected horizon, and repeating applying the perturbation, applying the residual moveout and determining the flatness until a selected range of perturbation is covered (Figs. 6-9) (Pages 239-241, 247).

With regard to claim 4, Ahmed discloses that determining the flatness comprises determining a semblance between traces in the common image gather, wherein a maximum semblance corresponds to a maximum flatness (Pages 246-247, Fig. 8).

With regard to claim 5, Ahmed discloses that updating the velocity-depth model comprises replacing migration velocities with velocities obtained from determining semblance of the common image gather and updating depth using the velocities obtained from the determining semblance (Pages 243, 247-248).

With regard to claim 6, Ahmed discloses repeating the residual migration velocity analysis in the depth-offset domain on a deeper horizon than the at least one selected horizon based on the updated velocity-depth model, and repeating the updating the velocity-depth model based on the repeated residual analysis (Fig. 5) (Pages 241-243, 247-248).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevc (US20020042678) in view of Ahmed (Journal of Seismic Exploration 12, 237-257 (2003)).

With regard to claim 1, Bevc discloses a method for processing seismic data. Bevc discloses prestack depth migrating the seismic data to generate common image gathers using an initial velocity-depth model, selecting at least one horizon in the migrated seismic data, performing a residual migration velocity analysis in the ray parameter-offset domain at the at least one selected horizon, and updating the velocity-depth model based on the residual migration velocity analysis (Pages 2-3). Bevc discloses that the data can be in the offset-depth domain (Fig. 2b) (Paragraph [0054]), but describes a method for residual velocity analysis in the ray parameter angle domain (Paragraph [0028]). Therefore, it would have been obvious to perform the method in the depth-offset domain since Bevc acknowledges that it is an alternative to the angle domain. Ahmed discloses that that it is possible to map a CIG from the ray parameter domain to the offset-depth domain using known equations (Abstract; Page 240). It would have been obvious to modify Bevc to include performing the residual velocity analysis in the depth-offset domain by the method described in Ahmed in order to be able to interactively update the velocity-depth model of the formation being studied.

With regard to claim 2, Bevc discloses that the prestack depth migration comprises Kirchhoff integral depth migration (Paragraph [0022]).

With regard to claim 3, Bevc discloses that the residual migration velocity analysis comprises applying a perturbation to an initial value of slowness used in the migration, applying a residual moveout in a common image gather, determining flatness in a common image gather at a selected horizon, and repeating applying the perturbation, applying the residual moveout and determining the flatness until a selected range of perturbation is covered (Paragraphs [0035]-[0044]).

With regard to claim 4, Bevc discloses that determining the flatness comprises determining a semblance between traces in the common image gather, wherein a maximum semblance corresponds to a maximum flatness (Paragraphs [0037]-[0044]).

With regard to claim 5, Bevc discloses that updating the velocity-depth model comprises replacing migration velocities with velocities obtained from determining semblance of the common image gather and updating depth using the velocities obtained from the determining semblance (Page 3; Page 4, Updating the velocity model).

With regard to claim 6, Bevc discloses repeating the residual migration velocity analysis in the depth-offset domain on a deeper horizon than the at least one selected horizon based on the updated velocity-depth model, and repeating the updating the velocity-depth model based on the repeated residual analysis (Figs. 1, 6a-b) (Pages 3-4).

Conclusion


The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


SAH


JACK KEITH
PRIMARY EXAMINER
SPE 3663